

NEW BOMBYLIID FLIES REARED FROM
ANTHOPHORID BEES

(Diptera: Brachycera)

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While studying colonies of anthophorid bees, *Diadasia conso-ciata* Timberlake, and *D. bituberculata* (Cresson) in California, E. G. Linsley, J. W. MacSwain and R. F. Smith of the University of California reared three species of bombyliids from the nests of these bees. The flies were sent to me for identification, and all proved to be undescribed.

Two of these flies are rather closely related species belonging to the genus *Villa* (subgenus *Paravilla* of Painter) in the now generally accepted classification of the family; the third parasite is an interesting species of the genus *Anthrax* (a group better known in the literature under the generic names *Argyramoeba* and *Spogostylum*), very closely related to *Argyramoeba daphne* of Osten Sacken. I have compared these flies with various related forms in my collection in the California Insect Survey and collection of the University of California.

Many of the bombyliid flies are well known parasites of bees and wasps, or have been discovered living in their nests as inquiline. Fabre has written a most interesting account of the Anthrax Fly (*Anthrax trifasciata*) and its relation to the "wall bee," *Chalcidoma muraria* Retzius, in France. *Villa edititia* Say, related to the two species of *Villa* described in this paper, has been reported as a parasite of ground nesting bees of the genus *Anthophora*.

***Anthrax nidicola* Cole, new species**

(Figure 1)

The basic body color is black, but the species has a gray appearance. The wings are largely hyaline, with a few small, pale clouds; an extra crossvein forms three submarginal cells.

Head black, with a dull, iron gray "finish" (the texture too fine to be termed pollen), more hoary on the sides. Face and frons with short, erect, black hair, mixed with some yellowish at sides of oral margin; yellowish tomentum visible between this hair; tomentum of occiput finer and paler. Antennae satiny, gray black, of characteristic form, with black hairs on segments I and II. *Mesonotum* and *scutellum* gray black in color, dorsum covered with short, fine, dull golden tomentum, coarser and more dense on *scutellum*, on *mesonotum* appearing as broad stripes; some sparse black pile and black bristles on sides of *mesonotum* and on *scutellum*. The ruff is yellowish to white, with a few black hairs above. *Pleura* gray black, with

long bushy pile, which ranges from white to golden in color. Coxae with mixed black and yellowish bristles. *Abdomen* gray black, slightly more shining than thorax; as wide as thorax at base, tapering as in typical species of the genus; first tergite slightly longer than III, IV or V, second tergite longer than any other two tergites combined; first segment tufted with white hair on each side. In well preserved specimens (which are rare) there is

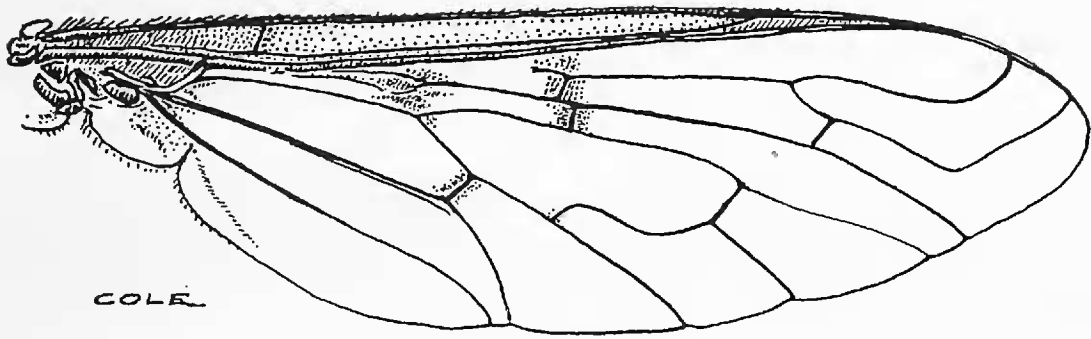


Fig. 1—Wing of *Anthrax nidicola* Cole.

a rather dense covering of tomentum on the abdomen, denser on sides and near apex, most of which is shining, snowy white, but golden brown at base of second tergite, and a few brown scales evident on third and fourth. Dorsum of abdomen with sparse, black, rather recumbent bristly hairs. Incisures yellowish red, widening apically (in a few specimens tergites VI and VII mostly reddish). Hypopygium largely reddish, the large dorsal valves semi-translucent, pale mahogany, the ventral plate with strong black hairs. Venter largely gray black, posterior margins of sternites reddish, and with a covering of whitish tomentum and sparse golden pile. Stem of halteres yellowish brown, knob honey yellow, tipped with ivory. *Femora* and last four tarsal segments black, the tibiae reddish. Bristles of the legs black. Pulvilli well developed. Legs with pale tomentum, the fish-scale tomentum of femora silvery. Wing (fig. 1) largely hyaline, pale brown at extreme base; veins heavy, black; costal cell grayish; a square blackish brown spot at middle of first basal cell (2nd R), and a brown spot on anterior crossvein and on the squared base of first submarginal (3rd R) where there is a stump of a vein; very narrow brown clouds at bases of third and fourth posterior cells. Three submarginal cells in all specimens examined, as in the type, a strong crossvein connecting the anterior branch of third vein (R_4) with the second vein (R_{2+3}). Length 6.5 mm.

Female. With the same basic coloring and marking as in the male. Less pile on the pleura, and pile of coxae more white. Dorsum of the abdomen mottled with white tomentose patches, and with spots of black tomentum tergites II, III and IV; some brownish tomentum scattered on dorsum. More blackish pile on abdomen than in male, some black pile mixed with the yellowish on venter. Genital segment with close-set, incurved, golden pile. Length 7 to 8 mm.

Holotype: Male from TRACY, SAN JOAQUIN COUNTY, CALIFORNIA, June 7, 1949, collected by J. W. MacSwain; female allotype from Palo Verde, Imperial County, California, April 8, 1949 (P. D. Hurd); fifteen male paratypes, Tracy, California, May 3 to June

21 (E. G. Linsley, J. W. MacSwain, R. F. Smith), also one from Cottonwood Springs, Riverside County, California, April 26 (L. W. Quate), and two collected at Redlands, San Bernardino County, California, September, 1914 (F. R. Cole).

This interesting species has near relatives in *Anthrax isis* (Meigen) and *Anthrax binotata* (Meigen), from Africa and Europe. It is very close to Osten Sacken's *daphne*, described at length and figured (wing) in volume I of the *Biologia Centrali-Americana*, but this species is usually larger, has only two submarginal cells, and most of my specimens are more dull brownish in general color, with smaller wing clouds, etc. I have a small specimen of *daphne* from Santa Fe, New Mexico; Osten Sacken stated: "Length 10 millim., but much smaller specimens occur."

Villa apicola Cole, new species

Body dull, gray black, first two antennal joints, face, femora, tibiae and bases of tarsi yellowish in ground color. Structural characters rather typical of the subgenus *Paravilla*. Wings brown on basal half, the color slanting from end of costal cell through middle of discal cell and into the apical fourth of the anal cell.

Male. First antennal joint about twice the length of second, the third joint long conical at base, this black basal portion half the length of third joint and equal to first and second joints combined. Frons at vertex little wider than base of third antennal joint. Face projecting, but not truly long conical; the face and frons with ochre yellow tomentum and with short proclinate black bristles; dense tomentum of occiput ochre yellow. The proboscis is not projecting. Pile and tomentum of thorax yellow to golden, fairly short; whitish pile over wing base; pile of pleura mostly longer, yellow to whitish yellow. Scutellum black, yellow tomentose and pilose. The thoracic bristles yellow. The halteres yellowish. *Abdomen* on dorsum with a dense covering of fine golden yellow tomentum. Abdominal pile sparse, yellow, denser and more bushy on sides and at base. Venter reddish on apical half, all the pile and tomentum yellowish. Abdomen without black tomentum. *Femora* and tibiae with yellow, appressed tomentum; basal half of tarsi yellow in ground color, apical joints blackened. Front claws almost equal to others in length, the front tibiae noticeably bristled. Wings more than half gray hyaline; brownish basal color runs with a vague outline from tip of costal cell back through basal third of first posterior cell, the middle of discal cell, and bases of third and fourth posterior cells and apex of anal cell; the auxiliary cell is broadly margined gray hyaline; veins are black, strong and with no indication of three submarginal cells, a character we find in the related species described in the paragraphs following this; the anterior cross-vein is about opposite the middle of the discal cell. Length 6 mm.

Female—Similar to the male. The frons is broader at the vertex (being twice the width of the third antennal joint at its base and about twice the

width of the ocellar tubercle). The face is more typically conical than in the male. The pile on head and mesonotum is about the same as on male; the tomentum on the occiput is more whitish, and there is whitish tomentum on the sides of the long second abdominal tergite.

Holotype: Male, *allotype* female, and paratypes from TRACY, SAN JOAQUIN COUNTY, CALIFORNIA, April 26, 1949, reared from cells of the bee *Diadasia consociata* Timberlake.

Villa (Paravilla) tricellula Cole, new species

Body black, except for the reddish color of first antennal joint and genitalia, and portions of face, femora and tibiae. The principal characters are typical of Painter's subgenus *Paravilla*, which was based on *edititiodes* Painter (Jour. Kans. Ent. Soc., VI, p. 10). The wings are brown on the anterior proximal portion, and on the anterior and posterior crossveins. There are three submarginal cells (See Fig. 2).

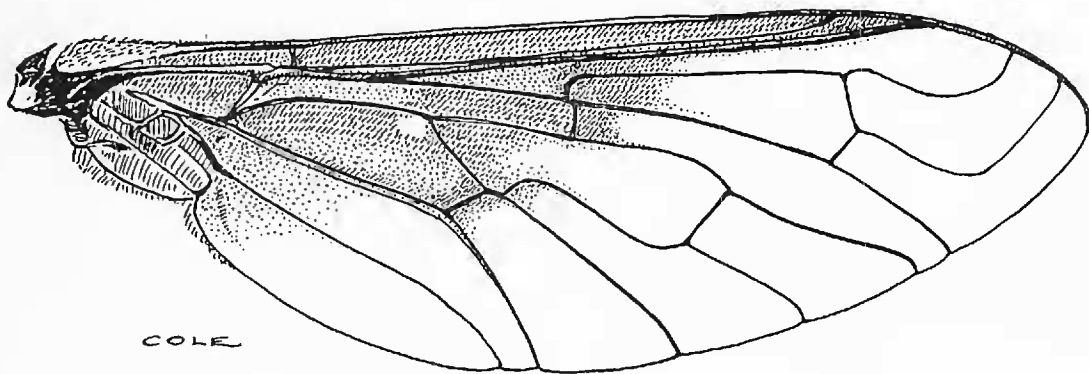


Fig. 2. Wing of *Villa (Paravilla) tricellula* Cole.

Female—The ground color of most of the body is black, gray dusted to semi-shining. First antennal joint about one-third longer than second, dull reddish in color, second joint with a slight reddish tinge (not noticeable in some specimens). Third antennal joint black, long conical at base, the styliform portion slightly longer than base. The orange yellow face is projecting and conical, the proboscis extending only slightly beyond oral margin. Frons and face with yellowish tomentum and short black pile, the pile erect on frons and more abundant on lower third; tomentum of vertex yellowish, silvery white on the rest of the occiput. *Pile* and tomentum of thorax largely dull yellowish, some white and more shining on scutellum, above wing base and on lower pleura. Bristles of mesonotum and scutellum golden yellow. Yellowish pile longest on collar or ruff and on mesopleura. Halteres yellowish. *Abdomen* gray black, semi-shining, rather densely pilose, and with a covering of narrow tomentum-scales in well preserved specimens; the pile mostly white anteriorly, where it is longest and semi-erect. Narrow posterior borders of black, bristly pile on second and following segments, this pile more abundant posteriorly; some of tomentum on dorsum straw yellow. Pile of first sternite white, the balance of venter yellow pilose and tomentose. *Femora* yellow; *tibiae* yellow, darker at tips, the tarsi blackish. The bristles

of legs black, quite apparent on front tibiae. Front claws as large as others. Femora and tibiae with dense yellowish tomentum. *Wings* are largely hyaline, gray brown on anterior proximal portion, and not filling much of the basal portion of discal cell; discal, anal and auxiliary cells largely hyaline in the type (slightly more clouded in some specimens); veins heavy and black; a strong crossvein connects third and fourth veins (R_{2+3} and R_4), forming three submarginal cells in all of the type series. There are strong clouds on anterior crossvein (r-m) and posterior crossvein (m). *Length* 10 mm.

Holotype: Female and 16 paratypes were reared from cells of *Diadasia bituberculata* (Cresson) collected by E. G. Linsley and J. W. MacSwain at BARRETT SPRINGS, SAN DIEGO COUNTY, CALIFORNIA, on April 20, 1950.

It is most unusual to rear a group of seventeen parasite specimens (at least in Diptera), all of one sex. Among the paratypes is a freak specimen, having one wing with several spur veins along R_s and extra crossveins forming three discal cells.

I have what I take to be *Villa (Paravilla) edititoides* Painter from Lassen County, California (also some related forms which are undescribed), and this species has much more of the wing shaded brown. Painter placed in his subgenus *Paravilla* the following species: *consul* (Osten Sacken), *cuniculus* (Osten Sacken), *pallita* (Loew), *diagonalis* (Loew), *obscura* (Coquillett), *lacunaris* (Coquillett) and *nemakogensis* (Graenicher).

Specimens of a closely related and apparently undescribed fly were taken in San Antonio Valley, Santa Clara County, September 14, by P. D. Hurd; this form has *two* submarginal cells, the wings slightly more infuscated, abdomen with white tomentum and less black, bristly pile, and with small triangles of black tomentum on second, third and fourth tergites.

BOOK NOTICE

THE SCRUB-TYPHUS AND SCRUB-ITCH MITES (TROMBICULIDAE: ACARINA) OF THE ASIATIC-PACIFIC REGION. By H. Womersley. Published by the South Australian Museum as Vol. X of the Museum Records. Paper covers. Part I, 436 pp., 4 text figs.; Part II, 240 pp. containing 120 pls. of line drawings opposed by the legends.

According to a press notice: "The family, subfamily and genera are fully keyed. The classification hitherto largely based on larvae is revised on adult and nymphal characters. . . . Total species mentioned . . . 255." Price 3 pounds, 3 shillings (Australian). The issue is limited; orders should be sent to The Director, South Australian Museum, North Terrace, Adelaide, South Australia.